CLAIMS:

We claim:

1. An acoustic telemetry system comprising communications along a plurality of transceivers attached to a string of tools in a borehole, wherein, after installation in the borehole, ones of said plurality of transceivers resolve communication parameters with ones of said plurality of transceivers.

2. The acoustic telemetry system according to Claim 1, wherein said string of tools are from the group consisting of drill stem test tubing, coiled tubing, a drilling workstring, and a production string.

3. The acoustic telemetry system of Claim 1, wherein said string of tools includes a multilateral junction head.

4. The acoustic telemetry system of Claim 3, further comprising at least two separate lines of communications below said multilateral junction head.

5. An acoustic telemetry system comprising -directional communications along a plurality of transceivers attached to a string of tools in a borehole, wherein during normal operation of said transceivers, ones of said transceivers can initiate a calibration process in order to reconfigure communication parameters with another transceiver.

6. The acoustic telemetry system according to Claim 5, wherein said string of tools are from the group consisting of drill stem test tubing, coiled tubing, a drilling workstring, and a production string.

7. The acoustic telemetry system of Claim 5, wherein said string of tools includes a multilateral junction head.

8. The acoustic telemetry system of Claim 7, further comprising at least two separate lines of communications below said multilateral junction head.

9. A method of acoustical communication, comprising the steps of:

- attaching a plurality of transceivers at intervals along a string of tools in a borehole, said plurality of transceivers having respective associated processors;
- negotiating communication parameters between a first transceiver and a second transceiver of said plurality of transceivers to obtain optimal communications between said first transceiver and said second transceiver;
- communicating data and instructions between a surface processor and downhole equipment, which is attached to said string of tools, through said plurality of transceivers.

10. The method of acoustical communications of Claim 9, wherein said string of tools are from the group consisting of drill stem test tubing, coiled tubing, a drilling workstring, and a production string.

11. The method of acoustical communications of Claim 9, wherein said downhole equipment is a sensor.

12. The method of acoustical communications of Claim 9, wherein said negotiating step uses on-off keying on a broadband.

13. The method of acoustical communications of Claim 9, wherein said communicating step uses frequency shift keying on at least two frequencies.

14. A method of acoustical communications, comprising the steps of:

- attaching a plurality of transceivers at intervals along a string of tools in a borehole, said plurality of transceivers having respective associated processors;
- communicating data and instructions between a surface processor and downhole equipment, which is attached to said string of tools, through said plurality of transceivers;
- during normal communications between a first transceiver and a second transceiver of said plurality of transceivers, re-initiating calibration instructions in order to optimize communications.

15. The method of acoustical communications of Claim 14, wherein said string of tools are from the group consisting of drill stem test tubing, coiled tubing, a drilling workstring, and a production string.

16. The method of acoustical communications of Claim 14, wherein said downhole equipment is a sensor.

17. The method of acoustical communications of Claim 9, wherein said communicating step uses frequency shift keying on at least two frequencies.

18. A chip for an acoustic telemetry system comprising:

first circuitry that acoustically sends channel characterization signals;

second circuitry that receives said channel characterization signals and selects a plurality of channel properties for use in transmission;

third circuitry that acoustically transmits notification of said plurality of channel properties for use in transmission; and

fourth circuitry that receives data and acoustically transmits commands using said plurality of channel properties for transmission;

whereby said chip can establish acoustical communications with a similar chip.

19. The chip for an acoustic telemetry system of Claim 18, wherein said plurality of channel properties comprises two frequencies and transmission by frequency shift keying.

20. The chip for an acoustic telemetry system of Claim 18, wherein said plurality of channel properties comprises a frequency and transmission by on-off keying.

21. The chip for an acoustic telemetry system of Claim 18, wherein said plurality of channel properties comprises an optimized number of cycles in a toneburst to obtain a balance between a clear signal, telemetry rates, and lifetime of a long term downhole power supply.

22. A structure associated with a borehole, said structure comprising:

a plurality of tools assembled in the borehole;

an acoustic telemetry system comprising communications along a plurality of transceivers attached to said string of tools in a borehole, wherein ones of said plurality of transceivers resolve communication parameters with other ones of said plurality of transceivers.

23. The structure of Claim 23, wherein ones of said plurality of transceivers resolve communication parameters with other ones of said plurality of transceivers shortly after installation.

24. The structure of Claim 23, wherein ones of said plurality of transceivers resolve communication parameters with other ones of said plurality of transceivers when communications deteriorate.

25. The structure of Claim 23, wherein ones of said plurality of transceivers resolve communication parameters with other ones of said plurality of transceivers at regular periods during their lifetime.